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SCIENCE AND RELIGION

III. THE SCIENCE OF RELIGION

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At the close of the preceding lecture I gave a brief outline of what was called a scientific approach to the Christian religion. This really presented in very brief form, the science of religion, developed by observation rather than tradition. To connect that presentation with the present discussion I may remind you that observation has shown that religion is a universal human impulse; that the function of this impulse is to develop what is best in man; that the impulse of unselfishness expressing itself in service has proved to be the most effective in producing the desired result; and that the stimulus of love is the only one powerful enough to keep the impulse functional. The inevitable conclusion was that love stimulating service is the most effective religion and this is simply a statement of the Christian religion.

Passing from what may be called strictly the science of religion, I wish to present briefly the contribution that biology has made to religion. It is also the science of religion, in the sense that it shows how religion may use the contributions of science, and feel that it has a scientific basis.

It cannot be claimed that it has been any part of the purpose of biological investigation to make a contribution to religion. It has been concerned only in discovering the facts of plant and animal life, and in formulating laws based upon these facts. In so far as these facts and laws have a bearing upon religion, biology may be said to have contributed to religion, but only as two distinct bodies of fact and belief inevitably react upon one another when they overlap. That religion and biology are consistent is evidenced by the fact that they are so regarded by those who have given attention to both. They seem inconsistent only to those who have given attention to one of them and have no real knowledge of the other.

It is not necessary, in this connection, to define religion with great exactness. Perhaps no definition can be formulated that would seem fair or complete to every type of mind and belief. For our present purpose it seems sufficient to say that it involves a strong sense of obligation, and that it overlaps biology when this obligation involves the development of the most efficient types of men and women. Efficiency in this connection means the development of the maximum physical, mental, and spiritual capacities.

The religious impulse is so universal a possession that it must be reckoned with among other human impulses, and its significance in human nature should be understood. From the point of view of a biologist, rational obedience to this impulse results in the best type of development, which means not only the highest development of natural capacities, but chiefly the best balance of these capacities. For example, the religious impulse does not express itself fully in a trained body or in a trained mind, but in the subordination of the trained body and mind to the trained spirit. This is the most effective balance of one's powers, concerning which there is no serious discussion, and it is the peculiar function of religion to establish it. It is this perfect balance of highly developed capacities that makes Jesus the ideal type of manhood. It is upon this aspect of religion, which means the proper conduct of one's life, that biology has reacted so strongly that it may be said to have made contributions.

In association with the physical sciences it has developed a point of view that has revolutionized our habits of thought. This point of view has been called "the scientific spirit," but it is an attitude of mind that is not peculiar to the so-called sciences; it has merely been strongly developed by the growth of physical and biological investigation. It now permeates all investigations, and is the animating spirit of any investigator in any subject. It was inevitable that this same spirit should permeate all real thought concerning religion. The effect of this has been happy or unhappy, dependent upon one's point of view, but it was inevitable. To those who prefer to have religion freed from what may be called its fetish-like appendages, and developed as a definite body of fundamental laws, the result has seemed a great gain. It is far more attractive to thinking people to work under a set of *principles* than under a set of *rules*, for principles apply to all situations, while rules can never be inclusive enough. This contribution to religion cannot be credited to biology alone, but it seems to be a fitting introduction to the contributions peculiar to biology.

A fundamental contribution of biology that has reacted favorably upon religion is the increasing body of knowledge in reference to the effects of conduct upon the welfare of the human body. So long as proper personal conduct is a religious demand only, it is observed only by those strongly dominated by the religious impulse, and even with them the pressure of personal interest is rather vague and distant. But when this religious demand is reinforced by a biological demand, proper conduct is observed even by many who are not dominantly religious, and upon even those who are religious the pressure of personal interest becomes more definite and immediate.

It is a very significant fact that the rules of conduct for the best development of men, discovered first by the experience of the human race, and afterward formulated as religious precepts, have now been established as laws of biology. This does not mean that biology deserves credit for the discovery, but that experience, religion, and biology can now combine in enforcing proper conduct; that what was thought to be only a religious precept, deserving the attention only of church members who have pledged themselves to obedience, is also a biological precept, as necessary to obey as any other law of nature; that the penalty of disobedience is not doubtful and distant, but certain and immediate. In short, the appeal for proper conduct has been made stronger not only for those who would be religious in any event, but also for many who otherwise would not be religious at all. It is not necessary to cite the personal habits involved in proper conduct, for they are familiar to all of you.

Passing from the more general reactions of biology upon religion to the more special, the recent intensive work upon heredity must be considered. This work reacts upon religion because it has to do with the welfare of the human race, including its moral welfare. Heredity is the most important and the most difficult problem of biology. It has passed from the stage of crude observation and inference to the stage of rigidly controlled experiment. It follows that there are some things we really know about heredity, but this knowledge has brought into view, as never before, the vast stretches of ignorance that remain to be filled in with knowledge. We must also distinguish sharply between the things we know and the general conclusions we have based upon them, which are at best our present working hypotheses.

It is well for Christian leaders to realize the present status of our knowledge of human inheritance. There is abroad an impression that we know much more than we do. This subject has become more than one of natural curiosity, for it is being made the basis of proposed legislation in reference to what is called eugenics. As Christian leaders you ought to be in a position to form a judgment in reference to what involves so important a human interest.

In the first place, what do we *know* of the laws of inheritance in general? I do not mean what we infer, but what we have actually demonstrated by studying inheritance under rigid experimental control. The kind of material suitable for this experimental work should be realized.

In the first place, the generations must be short, so that as many successive generations as possible may be under control. The more numerous the generations, the more definite does the behavior of inheritance become. Even an annual plant has a generation too long for convenience. For example, the experimenter Mendel, who gave us the first statement of laws of inheritance, worked with the common garden pea, and it took him seven years to reach a conclusion in reference to the inheritance of certain simple superficial characters. Since that time shorter generations have been used, chiefly among very low-grade animals, in which many generations may be obtained in a single year. The conclusion from this situation is that all we know about inheritance in general has come from experiments with a few plants and animals for a few years; and from this knowledge we *infer* certain things concerning inheritance in man.

In the second place, the characters observed were relatively few and very simple. As soon as more numerous and more complex characters came to be included, apparent contradictions of the laws appeared, and it has taken much mental agility to make the new facts seen to come under the laws, and it is obvious that the laws formulated do not apply in all cases. You may be interested in knowing that during the last few years corn is the most studied plant in reference to inheritance. Numerous investigators are working on it, and every investigator adds facts that make explanation more difficult.

You are prepared now for a statement of our knowledge of inheritance in man. From the scientific standpoint the evidence is most uncertain, because man is beyond rigid experimental control. Such evidence as we have, therefore, cannot be tested. Even if man were subject to experiment, he would be very unfavorable material for three reasons: (1) the characters involved are very numerous and complex, far more so than in the plants and animals being studied, which are complex enough to be baffling; (2) the number of offspring is comparatively small, so that the possibilities and ratios of inheritance could not be established; (3) the generations are so long that it would take hundreds of years of experimental control to establish anything.

Since we cannot obtain experimental data from man, what is the method used? Evidence of every kind is collected from every source. Family pedigrees are examined, both from records and from hearsay evidence; records of physicians are obtained, which of course deal chiefly with diseases and defects, not with normal inheritance. This heterogeneous material is then compared with the standard pedigrees worked out in certain plants and animals, and conclusions drawn.

To summarize the situation, it may be said that the so-called "facts" of human inheritance are *inferences* from data of every degree of reliability and unreliability, impossible to be checked by experiment, and interpreted by what is known concerning a few plants and animals. As a result of this uncertanity, the conclusions are not uniform. For example, there are two recognized schools of eugenics, the English and American, and these schools are at variance in many of their conclusions, and especially conclusions which call for practical application. When the experts differ it is evident that we have not attained demonstration.

It is this vague field that eugenics has entered, basing its propositions upon data of the kind indicated. It is really a national movement, calling upon the press and the pulpit to advocate its propositions. It is a movement, therefore, concerning which you should be informed. "Eugenics" means "well-born," and the movement is an attempt to apply our knowledge of the laws of inheritance to the improvement of the human race. Its motive is to give every child all the possible advantages that can be secured in connection with birth. It has two aspects: (1) a negative aspect; that is to eliminate the inheritance of undesirable characters; that is, to get rid of what we do not want; (2) a positive aspect; that is, to improve desirable characters, improving what we want. It is the double task, therefore, of elimination and improvement.

All the work thus far has been that of elimination, and therefore people in general think of eugenics as simply dealing with diseases and defects. This is certainly the most imperative present need in the field of eugenics. It is like clearing the ground of weeds preliminary to cultivation. At present, we are seeking to eliminate the *worst;* later on, we may be able to make the merely inferior *better.*

In this preliminary emergency work of elimination, eugenics must reckon with two kinds of abnormal inheritance, for they demand different kinds of treatment. Here is where proposed legislation often fails. It is a great movement with great dangers. The dangers arise from insufficient knowledge (thinking that things are settled that are not), and hasty legislation, which may be futile, unscientific, and often cruel. Before you give encouragement and support to these measures, you should secure competent opinion; not the opinion of the enthusiastic promoters, but of men at work in genetics.

I wish now to connect such knowledge of human inheritance as we possess with religion; in other words, to indicate that religion has a scientific basis in inheritance.

We know that certain things are likely to be inherited and other things not. For example, certain diseases of the parent are likely to be transmitted to the child; while an "acquired character," such as a scar or a lame leg, is not transmitted. We know, also, that heredity transmits not only similarity but also dissimilarity, and this dissimilarity results in what we call individuality. No two human beings are exactly alike, and it is this fact that frees a child more or less from the fatality of its parents. Otherwise, heredity would be a machine-like expression of predestination, and human responsibility would have been reduced long since to a minimum.

When such facts of heredity as body resemblances, physical diseases, etc., were extended in imagination to include moral diseases or "tendencies," the subject of heredity entered the field of religion; and a terrible burden of responsibility was laid upon parents. The responsibility of parents cannot be exaggerated, but this particular form of responsibility was exaggerated for a time. The result of this feeling of responsibility in connection with heredity led to the development of what is called the science of eugenics, already referred to, but as yet it is more of a religion than a science. The whole subject of inheritance, as heredity is better called, as I have indicated, is too extremely complex to permit safe generalizations as yet, so that any proposed measures in the interest of eugenics, except such as deal with inheritable diseases, may be wide of the mark.

To appreciate this situation, and also to realize that inheritance is full of hope as well as of danger, a brief statement in reference to the machinery of heredity is necessary. The living substance, called protoplasm, is the most potential substance known. It has expressed its possibilities in the infinite variety of structures and forms it has produced among plants and animals. This living substance is organized into minute structural units called cells, millions of which make up the human body. The bodies of the simplest plants and animals consist of a single such unit, and of course this single cell has the power not only to do the work connected with living but also to reproduce. As the bodies of plants and animals become many-celled, some of the cells lost the power of reproduction, but retained other powers. In the higher plants and animals most of the cells have lost the power of reproduction, but it is these comparatively few reproductive cells that have retained all the original powers of a living cell. Reproductive cells, therefore, are not specialized cells, but they are the only generalized cells of a complex body, the only cells that have retained the primal powers. It is the muscle cells, or nerve cells, or bone cells that are specialized, not the reproductive cells. This fact is important to remember, for it means that a reproductive cell is not narrowly limited in its possibilities, but that it may express itself in the greatest variety of ways.

When fertilization occurs, two of these very potential reproductive cells unite to form a single new cell, the fertilized egg, and this egg produces the child. Each of the reproductive cells that enters into union contains the accumulated inheritances from a long line of ancestors, and the combination may well be regarded as a new one; at least it did not exist in either of the parents. Among all the possibilities, or perhaps better capacities, thus locked up in the protoplasmic egg, which ones will get expression? The responsibility of parents, so far as heredity is concerned, ends just here; that is, they are responsible for the limits set to the possibilities of the child, for the child can develop no other capacities than those it has received. It must be remembered however, that the parents possessed many possibilities that remained undeveloped; in fact, it is certainly true that no one of us has called upon more than a small fraction of the possibilities we have inherited. It follows that the child may develop very different possibilities from those developed by either parent; for example, pious parents may produce a renegade child; and from a drunken home may issue an upright child.

In the former case the child certainly inherited the possibility to develop into a righteous life; and in the latter case the child just as certainly inherited the possibility to develop into a drunkard; but in neither case, for some reason, were the possibilities developed by the parents the same as those developed by the child.

If parental responsibility, so far as inheritance goes, consists only in limiting the number and character of the capacities transmitted, what determines the selection of the capacities for cultivation? It is this second factor that eugenics is in danger of forgetting, in its eagerness to see that the parents are "fit." It is evident that they may be unfit so far as their own development is concerned, but at the same time they are very likely able to transmit capacities that are very fit for development. This second factor, that determines the selection of capacities, may be expressed by the single word *opportunity*. Inheritance determines the number and character of capacities, but opportunity selects those that are to develop. This second factor does not lighten the burden of parents but gives great hope to the child. It means that the child is not doomed to one form of inheritance, but that so long as its capacities can be stimulated by opportunity it may respond by development in any direction.

It is this second factor that furnishes a scientific basis for the claim of religion that no man is past hope on account of his inheritance, or even on account of his previous development. It is certainly a factor recognized by Jesus, for he never seems to have lost his confidence in the possibilities of men.

With such facts at hand, the activities of religion in connection with eugenics becomes clear.

1. The responsibility of parents in the matter of inheritance when it includes heritable diseases is evident and should be enforced. The maximum danger from such inheritance, however, is not avoided by safeguarding marriage. The far more subtle form of this danger comes from the social evil, on account of which thousands who may be fit when married become unfit afterward.

2. The responsibility of parents in the matter of inheritance in connection with undesirable tendencies should be taught persistently, for the evidence is clear that a strongly developed tendency in a parent may be the easiest tendency to develop in the child.

3. The most important part of the Christian program however, is to see to it that every child shall have the chance to respond to a stimulating opportunity. This will save thousands where the regulation of marriage will save one. It means a regulation of homes as well as of marriages. It makes the responsibility of parents continuous, and at the same time it puts responsibility upon the child. In a certain sense this has always been the Christian program, but not in the wide sense that these laws of inheritance and development suggest. It involves much more than Sunday schools and the instruction of Sunday schools, for it includes the total exposure and interests of children.

This program is a larger one than the present movement for eugenics has suggested. In fact, this movement is limited at present to the obvious things that might be accomplished by legislation. But the joint demand of religion and of biology is not limited by the possibilities of legislation. The only organizations equipped to undertake such a campaign are those into whose field it belongs naturally. The Christian organizations have the opportunity to add the practical suggestions of biology to their own great motive and to transform eugenics so that it may really be another effective form of religion.

NOTE.—The foregoing is one of a series of lectures delivered at the McCormick Theological Seminary, Chicago.